

Tocantins and the Araguaya, from the point of view of navigation. We are consequently much indebted to Mr. Bullock, who spent some considerable time recently in examining the possibilities of these rivers, for coming to give us an account of them this evening. I now ask Mr. Bullock if he will be kind enough to give us his paper.

Mr. Bullock then read the paper printed above.

The PRESIDENT: Mr. Bullock has indeed taken us through a little-known country; so little known is it, indeed, that I have not succeeded in finding any member of this Society who is capable, or at any rate who has expressed any desire to add to what the lecturer has said. It is true that I did discover, accidentally, just before the meeting that one genial member of our Council has had considerable experience of travel in Brazil. I asked him whereabouts in Brazil he had travelled, and he said, "Oh, everywhere." When I at once told him that he would consequently be called upon to add something to the lecture this evening he qualified his statement by saying that he had travelled everywhere in Brazil except that part described by Captain Bullock. We have, therefore, no one who is competent to criticize the lecture this evening. From the point of view of a lecturer that is a state of affairs which, no doubt, has certain advantages! No matter how astonishing are the statements which he makes, he can make them with complete confidence that they will not be contradicted. From the point of view of the audience it also, of course, has advantages, namely, that we all learn a great deal that we did not know before. Personally I used to think of Brazil hazily as a country from which nuts come. I know a great deal more about it now than I did then. The Araguaya basin appears to be still a somewhat savage country. Even the majority of the fish, as far as I can make out, displayed a number of very savage tendencies, from the fish that inconveniently puts up a spike for the unwary biped to tread upon, to the fish who leapt out of the water in their desire to gorge upon a carcase. Mr. Bullock also showed us what I thought was an admirable photograph of a forest fire, but said it was not a very good one. I do not know whether he was referring to the photograph or the fire, but I think I may assure him that all of us thought that both the photograph and the fire were very respectable. I wish that I could add something to what the lecturer has told you this evening, but I cannot, and I will conclude, therefore, by offering to Mr. Bullock, on your behalf, our most sincere thanks for his interesting discourse this evening. I would also congratulate him upon his success in exploring and making known such a very large area of such a little-known country.

THE USE OF WATERMARKS IN DATING OLD MAPS AND DOCUMENTS

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THE idea of authenticating old documents by an examination of the watermarks of the paper is no new one. All who have had to do with early documents, whether as collectors, dealers, archivists,

or students, have naturally turned to the marks on the paper as a possible clue to the date or place of origin. Even in the eighteenth century Sir J. Fenn, when editing the Paston Letters, took account of the marks of the papers used and gave copies of many of them. In the nineteenth century Sotheby in this country, Midoux and Matton in France, and others elsewhere, attempted a more systematic study; but the vast number of the marks made the collection of data a slow and laborious process, and though much good work was done by Wiener, Heitz, Likachev, Bofarull y Sans, and others, it was only on the publication in 1907 of Briquet's monumental work, in which over 16,000 examples of paper-marks are figured, that material at all adequate for the solution of questions of date or authenticity was at last made available. It is needless to say that Briquet's work has been drawn upon to the fullest extent in the preparation of the present paper.

It might be thought that Briquet's labours had left little to be done by others in this field, but nothing could be farther from the truth. The vastness of the subject compelled Briquet to adopt a posterior limit of date for his great collection, and he fixed this at the year 1600, so that for later periods we have only incidental references in his work. Owing to the comparatively late appearance in the field of English paper-makers, he left their work entirely on one side; moreover he devoted his chief attention to manuscript documents, and allowed that there was still "infiniment à faire" in the collection and study of marks from printed books. It is hoped that the present paper, while offering little that can be called new, may induce others to cooperate in collecting the data still needed; and that those interested in the subject may be able to supply the answers to some at least of the many questions which to me are still unsolved riddles.

A few general considerations are necessary at the outset in order to gain some idea of the degree of precision of the evidence supplied by watermarks. It is not claimed, of course, that any date can be absolutely determined by this method: all that can be said is that it may supply useful collateral evidence in support or refutation of conclusions reached otherwise, or may at least bring the possibilities of date within comparatively narrow limits. Opinions differ on the important question of the length of life, if it may be so called, of individual marks, or of the moulds to which the devices were attached, but there seems little doubt that the latter would wear out pretty rapidly and have to be often renewed. (The date 1742 on many French papers used thirty or more years later proves nothing, as this date was given in obedience to an order of 1741 governing the French paper manufacture.) Briquet, after careful consideration of the statistical evidence, concludes that as a general rule the life of an individual mark may be put down as not over fifteen years. Did we possess only one dated example of a mark occurring in any given document, we could only say that the *probable* date of the latter

would lie between limits fifteen years on either side of the dated example. But when, as often happens, a large number of dated examples are available, we may fix the life of the marks much more closely ; and if, further, a number of different marks occur in one book or document, the possibilities of the common use of all at one time are narrowed down still more considerably. A test of Briquet's conclusions has been obtained thus. A number of marks from dated books or maps in the Society's Library, of which closely similar examples are given by Briquet, have been taken at random and the divergence of date noted for each. In 37 per cent. of the cases, the divergence proved to be two years or less ; in 50 per cent. three years or less ; and in 84 per cent. ten years or less. If therefore the dating of any of these books had depended upon the watermarks, the *probable* error would certainly be less than ten years.

There is of course a bare possibility that paper might be held in stock for some years after making. An exceptional case is recorded of the use of a paper two centuries after it was made, and this might happen with a manuscript document requiring but a small amount of paper : the survival of a stock of old paper sufficient for printing is so improbable that it is hardly necessary to consider it. Briquet's figures are pretty conclusive evidence that no large stocks were held ; thus, by comparing the *watermarked* dates of certain papers with the dates of actual use he found that in half the cases the interval was at most four and a half years, and in 92 per cent. of the cases twelve years or less. The great variety of marks often found in a single document points in the same direction. Much of the paper was made in small establishments, whose output was collected by agents for supply to printers at home or abroad, and the accumulation of large stocks would be extremely improbable.

In order to make the best use of our material it is not enough to establish the period in which a given mark was current, or even its place of origin as well. We must try to discover its normal range in space : for example, if a paper can be shown to have, normally, a quite restricted range, we shall feel it necessary to examine more closely than otherwise into the authenticity of a document on such paper, purporting to originate in a widely distant area. It is also desirable to note the usual sources of supply used by any given map-maker, for this may help us to judge of the correctness or otherwise of the ascription to him of an unsigned document. These points have been kept in view in the selection of the examples reproduced with this paper,* which will also illustrate the varying character of the marks used at different periods and in different countries. From time to time special attention will be called to the actual instances in which the marks have supplied evidence of date or

* References to these reproductions are given by numbers within brackets. It should be mentioned that a few of the earliest examples, shown for the sake of completeness, are taken from Briquet and other sources, but almost all the rest have been collected by myself from geographical books and maps.

authenticity. Some of them are also of interest as taking us behind the scenes, as it were, and giving an insight into the way in which early collections were brought together. Others when occurring on the end-papers of old bindings are useful as helping to establish the date of these. Thus the end-paper of a Ptolemy of 1597 in the Society's Library, in an old stamped leather binding, is marked with the pot, in a form recorded by Briquet once only, and that from the very year 1597; and the somewhat uncommon mark of the arms of Thann in Alsace (17), found on the end-papers of Pontanus's 'History of Amsterdam,' of 1611, is recorded elsewhere from 1602 and 1606. Both bindings may therefore with some confidence be pronounced contemporary.

The Earliest Types of Watermarks.—Many of the early marks represent common objects of everyday use (sickle (1), hammer, pincers, anvil (48, 49), ladder (57), scissors (4), and even the curry-comb (5), which shows a surprising identity with the modern form). Some even of these may have had an heraldic significance, heraldic charges being commonly chosen as marks. Thus the ladder, found only in Italy, may with some reason be supposed to point to the Scala family, and the anvil may perhaps be taken from the arms of Fabriano—cradle of paper-making in Italy—a smith working at his trade. Weapons, such as the crossbow (2), bow-and-arrow (9), crossed arrows (54, 89), are often met with.

Representations of animals or birds, real or mythical (10-14, 24), are among the commonest marks used by the early makers, especially in Italy, which long supplied paper to the rest of Europe—including even Spain, though this had itself learnt the art from the Arabs. Commonest of all is the bull's head (6, 7), first used in Italy, but soon copied in France and Germany. Its forms are legion, often in conjunction with the cross, crown or other addition, but certain broad types may be localized: thus in a simplified form, with eyes, but no indication of mouth or nostrils (7), it is always Italian, whilst a type with eyes omitted is always German (used originally, it is thought, by the Holbeins of Ravensburg).

Religious emblems, or marks with a certain symbolic significance, form another group which has been specially dealt with by Mr. Harold Bayley, who holds that even the pot (16, 22, 109), so hackneyed in later times, which gave its name to "pott" paper, may have originally carried an allusion to the Holy Grail. The Cross is met with in many forms (8, 15, 23, 32, 49, 57, etc.), alone or in combination, in later times mostly in conjunction with the I.H.S. (171). The simple Latin cross in an ovate shield is commonly met with in Spanish documents. The paschal lamb (45), emblem of St. John the Baptist, may have been taken at second hand from the insignia of places or persons which used it. The pilgrim with his staff (52, 59) was long a favourite mark in Italy, where "pilgrim paper" is still spoken of, and the cardinal's hat (51) was

entirely confined to Italy. The form with the cross above (69) seems generally later than the simpler form.

Armorial bearings, if used with caution, may supply a valuable clue to the place of origin. The bear of Berne (27), the crozier or pastoral staff of Basel, with or without the wyvern as supporter (28), the castle gateway of Ravensburg (177), the three crowns of Cologne (20), the *Kranzlein* of Saxony (26), the bend *potencée* of Champagne (21), are a few out of very many such marks. But they offer some pitfalls for the unwary, for a specimen with the stag's horns of Württemberg (88), does not, as it happens, come from Germany at all, but from Montbéliard, long annexed to Württemberg, though at a considerable distance from the Duchy. This is one out of many cases in which watermarks may help to teach history. When the coats are those of great families they may mean that the mills were held by grants from them or in some way enjoyed their patronage. Such are the oak tree of the Rovere, Dukes of Urbino (53), the six balls of the Medici (18), the six fleurs-de-lys of the Farnese (19), and others too many to mention.

The crown, one of the many marks which has given its name to a size of paper (30-33), makes a quite early appearance, and a primitive type occurs in the Paston Letters. Certain types are specially Italian (31), and when combined with a countermark in the corner are always Venetian. The tall "diadem" crown or "tiara" was in special favour in the early sixteenth century, some types being Italian (32), others German (33). Flowers and fruits (34-37, 58) are also among the early marks, the latter, once more, occurring chiefly in Italy. The fleur-de-lys appears from quite early times in the greatest variety of forms, either alone or in combination. Some are specially characteristic however, e.g. the *florence* form of Florence (38). In a circle, sometimes with star above (39), it had a very long currency in Italy.

A series of early marks (21-25) shown on the first sheet of reproductions affords an instance of the near approximation to a correct date which may be gained by means of the marks. All occur in a small quarto volume of only fifty-four leaves given to the Society's Library by Sir Clements Markham—one of several early printed versions of the voyage to the Holy Land by Ludolphus de Suchen (or Südheim). It bears no imprint, and was thought by Brunet to have been printed at Venice quite at the end of the fifteenth century. All five marks can be closely matched from Briquet (though the agreement is less definite in the case of No. 23 than of the others, this being a mark long current with slight modification), and the specimens given by him are shown beneath the corresponding marks from Ludolphus, with the dates for which they are recorded. All fall within the period 1468-83, or, if 23 be discarded, 1471-83.* The provenance of most of the papers

* Two of the marks, the pot and the letter Y, also occur in the Paston Letters before 1483.

used can also be learnt from the marks, the first of which—the arms of Champagne—shows the paper to have been made at or near Troyes. The rest are either French papers, or papers commonly used in France or the Netherlands, so that Brunet's assignment of the book to a Venice press is shown by the marks alone to be most improbable, the use of foreign paper at Venice in early days being almost unheard of. The researches of modern bibliographers have shown that the book was in fact printed at Gouda in Holland in 1484, so that the conclusions drawn from the marks prove to have been quite near the truth.

Less definite but still interesting conclusions may be reached by a study of the marks in the famous Berlinghieri Ptolemy, first printed, as indicated by the dedication, and what is known of the printer, about 1480. It was re-issued at an unknown date with no change beyond the printing of a title in red on the recto of the first leaf (blank in the first issue), and the addition of a "registrum" at the end. In both issues most of the text is printed on paper marked with the Cardinal's hat in its earliest form, but as this remained in use through a good part of the sixteenth century it gives little help for dating purposes. The other marks are different in the two issues, the first showing, *e.g.* the scissors, in a form current about 1480–90, whilst the second has a variety of marks (eight in all) of which those that can be most closely matched elsewhere bear dates lying between 1514 and 1543. Thus the date of 1500 suggested by bibliographers as about that of the second issue seems likely to be somewhat too early. The marks are not here reproduced, but four of them agree closely with Nos. 48, 50, 51, and 57, the others being a ship, bull, crescent in circle, and crossed arrows in circle.

Italian Marks of the Sixteenth Century.—Another series of marks on the same sheet (43 to 59) is given because it not only shows well some of the general characteristics of Italian marks of the sixteenth century, but because all occur in the collection of maps known as Lafreri's Atlas, and (in conjunction with the imprints on the maps themselves) throw some light on the actual way in which the collection was brought together. It has been recognized that this is not to be placed on the same level with the more systematic collections of Ortelius and Mercator, being an assemblage of maps by various authors, many of them drawn and engraved in Venice, whilst Lafreri was established at Rome. But the watermarks bring out more clearly still the haphazard nature of the collection, showing that a large number of the maps must have been not only engraved but printed away from Rome. Nordenskiöld's suggestion that Lafreri may have acquired some of the plates from their original makers seems therefore untenable. The place-names and dates below the copies given are those to be found on the respective maps (the name being placed in round brackets when only arrived at by deduction), whilst the names added in square brackets are those of places from which the same marks have been otherwise recorded. It

will be found that of ten marks associated with maps drawn or engraved at Venice only three are recorded from Rome, while most are known to have been used at or near Venice. Lafreri therefore must have merely brought together into one volume (to which he added a title-page) such maps as were contained in his stock-in-trade, or were specially chosen from this by his customers.

In order to make all the maps of a suitable size for binding together it was necessary in many cases to add wide margins to the sheets as originally printed, and it may be noted that the watermarks on these margins (Nos. 48 and 54) also occur, the one on the title-page, the other on certain maps, in the collection itself—a sufficiently clear indication that the Atlas (at least the copy given to the Society by Lord Peckover) has come down to us in the form in which it was originally issued, and that the margins were not added later in binding for the owner of a fortuitous collection of maps.

Among the specially Italian characters shown by these marks we may note (1) the pendant for the circle drawn round the mark proper ; (2) the common use of the star either above the circle or shield (as in 44, etc.) or within the shield (43) ; (3) the typically Italian forms of the shield (43, 57, etc.). Other marks from Italy are shown in Nos. 35-39, 68-71, those with the countermark in the corner (letters with often a trefoil above), being shown by this to be probably Venetian. The mark representing Justice with sword and scales (71, unfortunately rather indistinct) is by no means common, and only a much smaller specimen is given by Briquet. Another Italian mark, the pear-shaped fruit reproduced in the *Journal*, vol. 62, p. 282, is there shown to be of use in confirming the date of the newly found Contarini map of 1506. Since the account of that map was written I have found still another record of the use of the same mark, in an engraving by Andrea Mantegna of Mantua, who died in 1506 ; further confirmation of the date of the map, if such were needed, being thus supplied. In the Tower with crown and fleuron (40) we have another rare mark, to be found in Dürer's 'Apocalypse' of 1511, which has been used by Mr. Henry Stevens as evidence for the date of an unique early map, discovered by him some twenty years ago.

Typical French Marks.—Marks specially characteristic of France (at least after the earliest period) are the pot, the hand, and the grapes. The pot was used chiefly in Auvergne and Champagne. Of the vast number of forms of the hand, Briquet has shown that one (64) is characteristic of Genoa, another of north-west France (65), a third of north-east France (67), and a fourth (with crown above) of south-west France (112). Of the grapes (60-62, 84, 107), the earliest forms are decidedly the most artistic, the later ones becoming far too geometrically regular. The mark seems to have originated in north Italy, and to have spread to France, where it became so well established that it gave its name to

certain sizes of French paper, still recognized as "raisin." Placed near the edge of the sheet, as in the Servetus Ptolemy of 1541, printed at Vienne in Dauphiné (61), it may be localized in southern or south-western France, where it seems to have been a more or less general practice to place the mark in that unusual position. Other marks typically French are the St. Catherine's wheel (used chiefly in Auvergne ; 75) and the sphere (in the Angoumois ; 74).

Marks used in the Netherlands and Rhine Countries, 1570-1600.—With the marks found in the Italian Collection of Lafreri, it is of some interest to compare those met with in the atlases and maps of the great cartographers of the Low Countries, on whom the mantle of their Italian predecessors fell from about 1570 onwards. These marks, with others used in west Germany, are represented by Nos. 66, 72, 73, 76-104, and, as will be seen at once, are of a totally different character from those used in Italy. The pastoral staff or crozier (72, 73) was the special mark of Basel makers, and much paper so marked found its way to various parts of the Rhine basin, and other regions accessible by water-transport. The personal marks of the actual makers help still further to locate the papers with this mark. Thus the N H of No. 72 stands for Nicolas Heusler or Hüssler, whose special mark is added below, and he is also indicated by the house—a play upon his name—in No. 157. Similarly the tower below the crozier in No. 73 is a play upon the name Thurneysen, another of the great Basel makers. A favourite mark in this region is the monogram on an ornamental shield (66, 76-78, 80), and in this and other marks of the present group the frequent occurrence of the symbol resembling a Roman 4 (also much used as a masonic or merchant's trade-mark) is to be noted. It is held by Briquet to be specially indicative of an origin in the Rhine countries, particularly Lorraine. In No. 100 it is found in association with the Gothic letter P, a mark of much wider extension, both in time and space, the meaning of which has, however, never been satisfactorily determined, in spite of much discussion. The displayed eagle (72, 87, 93), either double- or single-headed, is also a mark long in favour in different regions. The fine specimen (93) occurs in the first edition of Mercator's Atlas, and being found on the map of America sometimes present in this, as well as on the sheet bearing the date of issue (1595) and other maps, lends support to the belief, sometimes challenged, that the America was really included in this issue, even if not in all copies. A careful study of the marks in all copies available would no doubt throw light on the precise manner of issue of the various parts of this first edition. Other marks on paper used by Mercator are the monograms 76-78 (77 being the earliest to occur), the serpent (94) and the smaller monograms (95 and 96). The last (96) occurs in all the covers of the set of big Mercator maps once existing in the University Library at Rome (see *Journal*, vol. 62, pp. 33, 138) and shows that, though those maps were originally published at

widely separated dates, the set in question must have been re-issued as a whole after all had been published.

The monogram 66 occurs on the excessively rare map by Hondius showing Drake's route round the world, which bears no date or place of publication. As the same mark is found in a book and map printed respectively at Cologne in 1600 and at Amsterdam in 1604, there seems no reason to adopt the suggestion (lately made to me by an American student of Drake) that the map was printed in England during Hondius's residence there before 1595. No. 97 is of a type which had a great vogue over a wide area for many years, with or without the interlaced Lorraine cross. Of its origin in Lorraine there is no doubt, the initials standing for Charles Duke of Lorraine and his wife Claude. In the simpler form it occurs in Wytfliet's work printed at Douai in 1605, and throughout the Mercator-Hondius Atlas of 1633. Besides the eagle (72, 87, 93) Nos. 80-82 are probably German marks, the F in 80 standing perhaps for Frankfurt.

Turning to marks of paper used for the maps of Ortelius (83-9, 91, 98-9, 101-4) we find a very different series, though including one (the smaller displayed eagle, 87) also used by Mercator. (The A C H of the Ortelius specimen almost certainly stands for Aachen, or Aix-la-Chapelle.) Most of the marks indicate a French origin, and the series as a whole seems to show that closer relations were maintained by Antwerp printers with the great paper-making centre of Troyes, than with the Rhine countries which supplied Amsterdam.* Of fourteen marks here reproduced from Ortelius, just half are almost certainly from Troyes. The makers here included (besides Denise, Nivelles, De Caroys and Jorné, whose names are to be read in the specimens shown) various members of the family of Le Bé, to which the reversed B's of No. 83 may with some probability be ascribed. The large crossed arrows (89), much used in some of the earliest editions of the 'Theatrum,' are almost certainly from Troyes, as they are found on the paper used for the local records. Another French paper is that with the arms of Montbéliard (88) already spoken of. The capital N (90), another mark used by one of the Nivelles, is not from Ortelius, but occurs on the British Museum copy of the rare map, "veuee et corige par le Seigneur Drach," reproduced in Mrs. Nuttall's volume 'New Light on Drake,' published by the Hakluyt Society.† Of the history of this map nothing definite is known, but the mark may perhaps help, in conjunction with other evidence, to throw some light upon it. Mr. Sprent of the British Museum thinks, from internal evidence, that the map may have been printed at Antwerp before 1590, and it may thus be the very earliest map made to illustrate the first English circumnavigation. It has been suggested, on the other

* The Plantijn Press used also a good deal of paper from Frankfurt.

† The specimen shown is borrowed from Briquet, as the mark is very indistinct in the map in question. It is there slightly smaller.

hand, that it was made much later to accompany a French translation of Drake's voyages; but the known use of Troyes papers at Antwerp about 1580-1600 (as shown above), and the fact that this particular mark was current, according to Briquet, between 1578 and 1602, lends decided support to Mr. Sprent's view.

Still another mark used by Jean Nivelles is the quaint one seen in No. 110. In connection with this mark Briquet quotes an old French verse about "*le chien de Jean Nivelles, qui fuit quand on l'appelle,*" to which there is an evident allusion, although the personage referred to in the verse is not the paper-maker but a French nobleman of earlier days whose son took up arms in a time of disturbance on the side opposed to his father, and resisted all efforts to induce him to return to his duty.

Marks in English Books, Sixteenth Century.—So far we have had no occasion to refer to English papers or their marks, although paper was made in England before the end of the fifteenth century. No. 42 (borrowed from Briquet) is a mark used by John Tate, who set up a mill at Hertford to which a visit was paid by Henry VII. It is to be found in the Paston Letters as well as in the '*Golden Legend*' printed by Wynkyn de Worde in 1498. But paper-users in this country long continued to depend largely upon the French mills, as they had from quite early times. The specimens 105 to 112, all taken from English geographical works, are mostly French, and other French marks found in England before 1600 include the crossed arrows (in the first issue of Saxton's County maps) and the hand of the type shown in No. 65. As above mentioned, this is characteristic of north-west France, while the hand with crown (112) came from south-west France. The specimen given is from Eden and Willes' collection of *Voyages*, the first general collection to be printed in English. The marks 108 and 111, however, are probably English—the portcullis as representing the Tudor badge (which now finds a place in the Westminster arms), and the fleur-de-lis because this type, with half of each petal shaded, is commonly found in English books for some time on from this period. The small pot (109) occurs commonly in England from this time on, but the paper probably came from Normandy. The fool's cap (120), so hackneyed a mark in the next century, already appears in England before 1600. Although originating abroad, the mark was adopted by Sir John Spielman (who started a mill at Dartford in the reign of Queen Elizabeth) and is to be found on a rare map by John Blagrave printed in 1596. One of the French marks in this group (106) gives an instance of a near approximation to true date afforded by a mark of somewhat unusual form. It occurs on the star maps published in 1590 by Thomas Hood, a Fellow of Trinity College, Cambridge. On a first rapid inspection of these maps (which are not often met with) the date escaped notice, but was very approximately fixed by a reference to Briquet, whose sole specimen of an identical watermark is recorded as from 1588.

Seventeenth and Early Eighteenth Century: England.—In the seventeenth century we lose Briquet's valuable guidance, apart from occasional historical excursions, and any conclusions put forward must be regarded as more or less provisional and tentative. English makers now appear more often in the field, but it is not always easy to discriminate between English and foreign makes. A paper much used in England in the first half of the seventeenth century seems to have been of foreign origin, unless indeed the marks were copied by English makers from a foreign original. They represent a coat-of-arms roughly agreeing with one used abroad even before 1600 (114), and like this have apparently a representation of the "toison d'or" (golden fleece) below the shield (113). Several members of the House of Orange and Nassau (including William the Silent) were members of the Order of the Toison d'or, but the arms, though bearing some resemblance to those of Nassau, are not identical.* The mark, or its variations, is found in many English geographical works, including Purchas's 'Pilgrims,' Camden's 'Britannia,' Fynes Moryson's 'Itinerary,' and Foxe's Map of the Arctic Regions (in the last forming a clear link with the foreign examples, as it includes the tower omitted in the others). As Elizabeth, daughter of William the Silent, married Henri de la Tour d'Auvergne, Duc de Bouillon, it might be thought that a mark embodying quarterings both of Nassau and (possibly) La Tour, had a reference to this lady. But it appears, in an example given by Briquet, as early as 1594 or before the date of the marriage. As used in the paper of Captain Smith's map of Virginia (the very rare first issue) it is of special interest as containing the date 1610, and therefore proving that the first issue was *not*, as is sometimes stated, brought out before that year. Other marks specially characteristic of paper used in England in this century (in addition to the ubiquitous fleur-de-lys) are the pot (very common in a small form in the first half of the century, and becoming larger and more elaborate in course of time—122), the fool's cap in various forms (120, 121), the horn on shield with crown above (in a form identical with that now in use), and the pair of pillars or posts (119), which I have suggested as the real origin of the term "post" paper, usually attributed to the supposed post-horn. (That "horn" and "post" papers were distinct kinds is shown by a letter from Madras dated 1666 to which my attention has been called by Mr. Foster of the India Office.) Paper with the Royal Arms was used by the House of Commons until tabooed by the "Rump" Parliament, but of this early type I have not yet secured an example. On the Restoration the mark gained a new lease of life in the elaborate form found in books of about 1670 (116). The displayed eagle, in a

* A foreign specimen from 1591 has *two* lions passant in the fourth quarter, bringing the mark still nearer the arms borne by the Prince of Orange, though the lion and fess of the first and third quarters in these are transposed. The second lion in the fourth quarter was very soon discarded, perhaps from want of space.

somewhat new form (123), is commonly found in English books of the late seventeenth century, and for a limited period a somewhat remarkable mark, taken by Mr. Bayley to represent the five loaves and two fishes (124), was frequently used, but the makers' names attached seem to be all French (Jobert, Durand, Conard, Vaulegard, Mauduit, and perhaps also the singular name *Homo* which I have found on the fly-leaf of a book bound in 1705 in France for the Polish collector Count Hoym). Unless therefore the names are those of Huguenot refugees, the paper would seem to have been imported.*

A common mark of the same period is a monogram (117), for which I have as yet found no certain explanation, but which may perhaps be read as the letters *ILP* to be found in an unmistakable form in association with other marks of this century (118). The monogram is met with in both English and Dutch books, either alone or as countermark, but I am assured by a Dutch student of watermarks that it does not signify a Dutch paper.

In the early eighteenth century the Royal Arms were again used (125), and, being changed on the accession of a new sovereign, may give a useful clue to date, especially as the old form was sometimes retained for a year or two, coupled with the initial letter of the new ruler. The arms of the City of London (126) were another favourite mark, as also was the serpent in a circular coil (127). Both of these are often supplemented by a countermark in the corner of the sheet, and in this respect they show a decided affinity with a group of marks which now makes its appearance, and is generally associated with an excellent crisp paper (128-9, 134-5). The main mark may consist only of a letter or letters (noteworthy in many cases for the emphasis given to the serifs, which are carried above the line), or may be associated with a star in the other half-sheet, in addition to the mark in the corner. This last may be either a minute design (pair of scales, etc., etc.) or another letter or combination of letters, *CM* with *T* below being particularly common (127, 134-5, 137). This is one of many instances of two sets of initials appearing on the same sheet, one possibly standing for the name of the proprietor of the mill, the other for the lessee who worked it.†

* I have a strong suspicion that the mark may be merely a degenerated form of the French Royal Arms (coats of France and Navarre) surrounded by the collar of one of the Royal orders of the Saint Esprit and Saint Michel. (The chain most resembles that of Saint Michel, but the star below belongs to the Saint Esprit.) The undoubted arms of the French king, with a similar collar and star, were used by the Troyes paper-maker Journé before 1600, and continued in use during the first few decades of the seventeenth century. Towards the end of the same century the arms of France only were much used, surrounded by a similar collar (No. 140), which here is undoubtedly that of Saint Michel, though still with the star (or cross) as pendant. Examples of similar degeneration at the hands of workmen who did not understand the meaning of the coats-of-arms are not uncommon.

† This group of marks appears to have so close an affinity in some ways with certain foreign marks to be dealt with later (130, 131), that we might suppose the papers

These marks may supply a clue to the true date of an issue of Petty's Atlas of Ireland, originally printed in 1683, of which a copy was lately acquired by the Society. The only date to be found in it is that below Petty's portrait given as a frontispiece, but as it is there engraved on the plate itself, it would not be changed on a re-issue. That such was made is known by the inclusion, in some copies, of a dedication to Lord Shelburne, who only received that title in 1719, but this is not found in the Society's copy. Yet the watermarks (135-7) show pretty conclusively, when compared with the dated examples of this group of marks, that the copy can hardly have been printed before about 1720. The shield with the bend and countermark Beauvais (*i.e.* the Beauvais mill at Augoulême) points to a date round about 1730, paper with the name of the same mill, with a similar four-line bend (instead of the usual three-line), being found in use in that year, and, in conjunction with other marks, in 1729 and 1732. The G R (note the serif of the G carried above the line) is not conclusive in itself, as it might conceivably stand for Gulielmus as well as Georgius, but as the mark is constantly found otherwise in the reigns of the Georges, but not in that of William, such a supposition is quite improbable.

A paper used a good deal in England, especially for manuscript work, bore the horn on a shield or cartouche of fanciful shape (132); and might be thought to come from Italy, as it sometimes bears the word Vorno, the name of a village near Lucca; but the initials I V T, associated with some examples, seem to indicate that it came from the mill owned by Van Tongheren of Angoulême. This mark, which will be referred to again presently, seems to have held its ground down to the nineteenth century.

Seventeenth and Eighteenth Centuries : France.—In France we find many armorial marks in use in the seventeenth century. The Royal Arms as borne by Louis XIV. (France and Navarre) occur about 1670 in an elaborate form, with the collars of the two Royal Orders. The arms of prominent men like Cardinal de Bouillon (143) or Colbert (139) would naturally be used mainly when such men were at the height of their influence. As the Cardinal belonged to the family of La Tour d'Auvergne, the use of his arms in that great paper-making district is easily explained. One of the quarterings of his coat—the three *torteaux* of the Counts of Boulogne, was also much used alone, the *torteaux* being

above spoken of as commonly used in English books to be also of foreign make. Some of the small corner-marks are to be found also within the circles of the foreign marks, *e.g.* that resembling a pair of eye-glasses (compare 129 with 131), and another representing a leg or boot. Small corner-marks (*e.g.* a star) also occur in some of the foreign papers referred to. Another similarity consists in the way the letters (or some of them) are joined together by the use of a continuous wire (in some papers used in Spain the whole of a maker's name is similarly made by one wire). Further, the initials L C used in one case as a corner-mark are also found in an identical form in conjunction with the specially French mark of the grapes.

sometimes, however, replaced by *annulets* (141). Other common marks were the crowned L (138, probably for Louis*), the clock-face (142), and the mace; the grapes and the fleur-de-lys still remaining much in evidence also. Among the great makers were Colombier, Dupuy, and the Sauvades, all of Auvergne.

During the eighteenth century the Auvergne makers produced stout papers of large size suitable for the huge atlases then in vogue, and the marks most used were the rosary and cross (144; already met with on papers made by Colombier and Dupuy before 1700), the two-headed eagle (147, a form used in the Angoumois), the IHS and Cross in an oval (145), and, in the latter half of the century, the doves (146). For smaller-sized papers, the grapes remained perhaps the most common mark. The maker's names, now usually given in full on the other half of the sheet, include the Dupuys, Cussons, Richards, Tamiziers, Micolons, and Vimals of Auvergne, and Pigoizard and De Michel of the Angoumois. A special form of the fleur-de-lys, with another mark below (148), was in use in the latter area. An echo of the French revolution is to be noticed in the cap of liberty as used in Vaugondy's big Atlas of 1793 (149, 150).

Papers used in Holland, Seventeenth to Eighteenth Century.—The many geographical works printed in Holland in the seventeenth and early eighteenth centuries show us what were some of the papers most used in that country, but many, if not most, were probably imported. Dr. Enschedé of Amsterdam thinks that the manufacture of paper for which Holland eventually became noted, acquired no great importance there until the next century. The fleur-de-lys on a crowned shield (155, 158), eventually taken as the mark denoting, with slight variations, paper of Imperial, Super-Royal, Medium, and Demy sizes, had a great vogue, but the initials W.R. attached to many examples indicate that some was made by Wendelin Riehel of Strassburg. This mark was much copied, and Briquet quotes a document showing that paper so marked was made at Nersac near Angoulême for the Netherlands market. The bend as an armorial charge, originally representing the arms of Strassburg, occurs in various forms (154, 156), but soon settles down into that still used for "Royal" paper (156). For a time the fool's cap found almost as much favour as in England, but generally in a varying form. The huntsman with horn is often found (151), also the horn on a shield (160) and the crozier of Basel (157), whence much paper was

* An earlier series of marks, all of the same style, and all containing a crowned letter (placed between two fleur-de-lys within a crowned shield), have caused a good deal of perplexity and offer a problem not yet satisfactorily solved. The letters found are B, F, L, and R (or possibly K), but the puzzle is that the name of no French king or regent began with B, and whilst L might stand for Louis, F for Francis, and K (if such it is) for Charles (Karl), the L is found throughout the sixteenth and early seventeenth centuries (from 1509 on), whilst of the six kings who reigned between 1515 and 1610 not one was a Louis. The R or K is found in use from 1493 to 1682.

sent down the Rhine to Holland. The imposing mark (161) showing Atlas upholding the World, is found in various editions of Blaeu's great atlas, at least from 1648, indicating that the paper for the same was probably made specially to Blaeu's order. Other marks found in the atlas show the letters I B (*e.g.* the elephant, 159), which might be thought to stand for Blaeu's name, were not the initials fairly common among paper-makers, one of the most notable being Jerome Blum of Basel. Another fine mark found in the productions of the firm of Blaeu is the laurel wreath with the initials I S within (162), which may perhaps stand for Jacques Salmon, proprietor of a paper mill at Angoulême about this time. The Dutch lion with sword, and darts representing the seven independent provinces (166), might be thought to indicate a Dutch paper, but it too may have been used by French makers who supplied the Dutch market. Towards the 'seventies of this century the arms of Amsterdam, with lions as supporters, began a career which lasted over a century at least, but this paper is known to have been made very largely in the Angoulême district for the Dutch market at mills kept going largely by Dutch capital. Paper with this mark was used in England, France, and Germany, as well as Holland, and a certain chronological sequence may be traced in its varying forms, so that it is not quite valueless for dating. The forms with mantling (164) seem to have been generally the earliest (one occurs in Dapper's 'Asia' of 1672), whereas the eighteenth-century forms had mostly the plain crown. The date 1742 on one example (163) proves unmistakably its French origin, being inserted in obedience to the French ordinance of 1741, and the makers' names or initials, often given as countermarks, are a further guide. The Amsterdam arms are to be found on the paper of a Dutch MS. in the British Museum—a copy of Tasman's original journal kept during the voyage of 1642—and, in conjunction with other marks in the same MS., give a fairly close indication of the date of writing, about which there has been considerable uncertainty. The arms are of the style of No. 163 (though without the date) and the countermark gives the name of I. Laroche, a member of which family is known to have worked a mill at Angoulême about 1750. Another of the marks is the horn within a shield of the pattern shown in No. 132, and the associated initials I V T seem to point to one of the Van Tongherens, owners of one of the Angoulême mills in the early eighteenth century; they are to be found also in one of the volumes of Valentyn's great collection of documents relating to the Dutch colonies, published in 1724–26. A third mark is of the type of No. 115, so long used with hardly any variation, but the initials L V G below and the I V of the countermark, are those of Dutch makers of the eighteenth century, which begin to occur commonly from about 1730 onwards. These indications point consistently to a date for the writing of the manuscript between 1725 and 1750, and confirm the view of Prof. Heeres that it

was perhaps written after 1700, as against that of others who thought it nearly contemporary with Tasman's voyage.

Some German Marks.—It is impossible within the limits of this paper to deal adequately with the marks of German paper-makers (some of which have been already referred to incidentally), though some of the German mills, as those at Ravensburg, Augsburg, Bautzen, and various places in Baden and Saxony, were noted from quite early times. Coats-of-arms were much used, as in other countries, some being extremely elaborate. One of the simpler forms, which seems to imply a connection with Ravensburg, is given in No. 177, and another in No. 168. The style of 167 seems to imply a German origin, and Nos. 175-6 and 178 are all from the same German book as 177.

Later Dutch and English Marks.—In the early eighteenth century the Dutch lion appears in a new form within a ring fence (169), in company with an allegorical female figure bearing the hat of liberty on a spear, with the words "Pro Patria" above. I am told that "pro patria" is a term still used in Holland for a class of paper. It was especially used for MS. work (*e.g.* legal documents), or for the fly-leaves of bound books, and had a great vogue in this country as well as in Holland.

It is often exceedingly difficult to say definitely whether a given paper is of Dutch or English make. The Dutch papers were now coming to the fore, and the reputation in which they were held in the eighteenth century is shown by the mark "All' Olandese" which I have found on an *Italian* paper of 1764, showing that, even in the early home of paper-making, to be made after the Dutch style was thought a recommendation. In England the Dutch lion holding the hat of Liberty on a pole or spear (165) was for a time, it seems, the recognized mark of "foolscap" paper, until replaced by the figure of Britannia now current. With this and the plain fleur-de-lys (133) the present-day marks for "Imperial," etc. (roughly similar to the old mark 158), "Royal" (*cf.* 136, 156), and "post" (*cf.* 115) held the field at the expense of many of their former rivals, so that something at least of the pleasing variety of the old marks became lost. Even in England these marks are commonly associated with the initials of the great Dutch makers Villedary and Van Gerrevink (IV and LVG), both sometimes occurring on the same sheet, or one of them in conjunction with the name of an English maker (*e.g.* J. Bates), so that one might almost think that they had become common property among paper-makers. Another Dutch firm—that of the Honigs—does not seem to have catered largely for the English market. On the English side the famous firm of Whatman was already a serious rival of the Dutch makers.

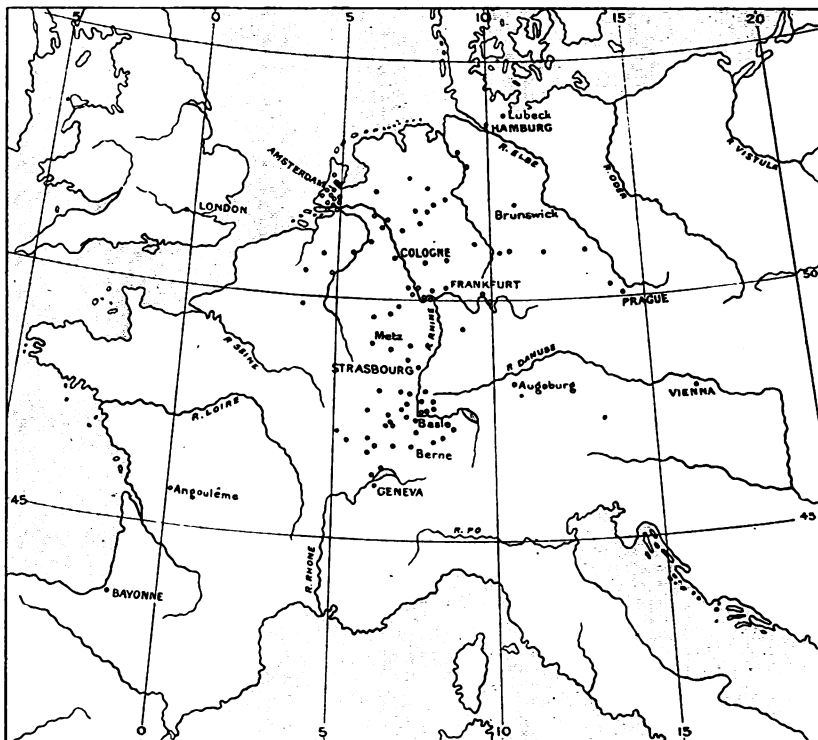
Later Spanish and Italian Marks.—In dealing with the later Spanish and Italian marks, it is not easy to disentangle them completely, so much Italian paper being used in Spain. In the late seventeenth and early

eighteenth century two closely allied forms are commonly met with in Spanish books and documents. One is an obvious development from the three moons or three circles of early Italian paper (131), and the other shows the arms of Genoa combined with two of the three circles (130). But here again caution is needed in assigning a place of origin, for there is documentary evidence (quoted by Briquet) that in the eighteenth century the paper with the "three O's" or "three rounds" was commonly made in south-west France after the "*façon de Gênes*" for export to Spain and the Indies. In another form—three crescents placed horizontally, with unusually coarse wire-marks—the mark does apparently denote an Italian paper, often exceedingly stout and firm, such as was used for collections of engravings, and almost to be identified by the touch. The fleur-de-lys in a circle (cf. 39) continues to be a common Italian mark, and we find a late variety of the crossbow (172), showing an entire change of style from the early form. It supplies the single instance I have met with where a tentative suggestion of Briquet's seems mistaken, as it appears in his collection as a solitary intruder among the older forms, with the suggested date 1602. It was found by him on the fly-leaf of a book of that date in what he thought a contemporary binding, but where the fly-leaf at least would appear to be much later. Elaborate designs with scrollwork (170) found considerable favour in Spain, but the most popular mark there in the eighteenth century appears to have been the bull fight (173). The arms of Lucca (174) are an unmistakable instance of an Italian paper used in Spain.

Besides the marks themselves there are other helpful indications, such as the position of the mark or its countermark on the sheet. We have seen that a position near the edge points generally to the south of France; similarly one in the very centre of the sheet was, according to Briquet, a characteristic of Genevan paper, whilst a countermark in the corner was, in old days at least, a mark of Venetian papers. The spacing of the two sets of wires to which the "chain" and "laid" marks are due may also be helpful, since in early days two periods of fine spacing were separated by one of wide spacing (see Nos. 36, 37 for examples of different types). But this part of the subject cannot now be enlarged upon.

Another branch of the subject which, by reason of its definitely geographical bearing, it would be interesting to pursue further did space permit, is that of the course of early trade as evidenced by the extent of country over which individual paper-marks were current. When it is possible to determine the centres at which papers bearing given marks were made, the great number of records brought together by Briquet permit us to lay down what we may call the "spheres of influence" of such papers, and this has been done for two marks of fairly wide diffusion in the accompanying two sketch-maps. The first

shows by means of small circles the principal places from which the crozier of Basel has been recorded, the second doing the same for the crowned hand of south-west France. The close clusters of circles around the respective districts of origin would suffice in themselves to indicate roughly whence the papers issued, and many of Briquet's conclusions are based upon a consideration of such regional distribution of occurrences. The importance of water-transport is particularly well brought out in the case of the Basel mark, while it will be seen that the two maps are more or less complementary, the spheres of the two

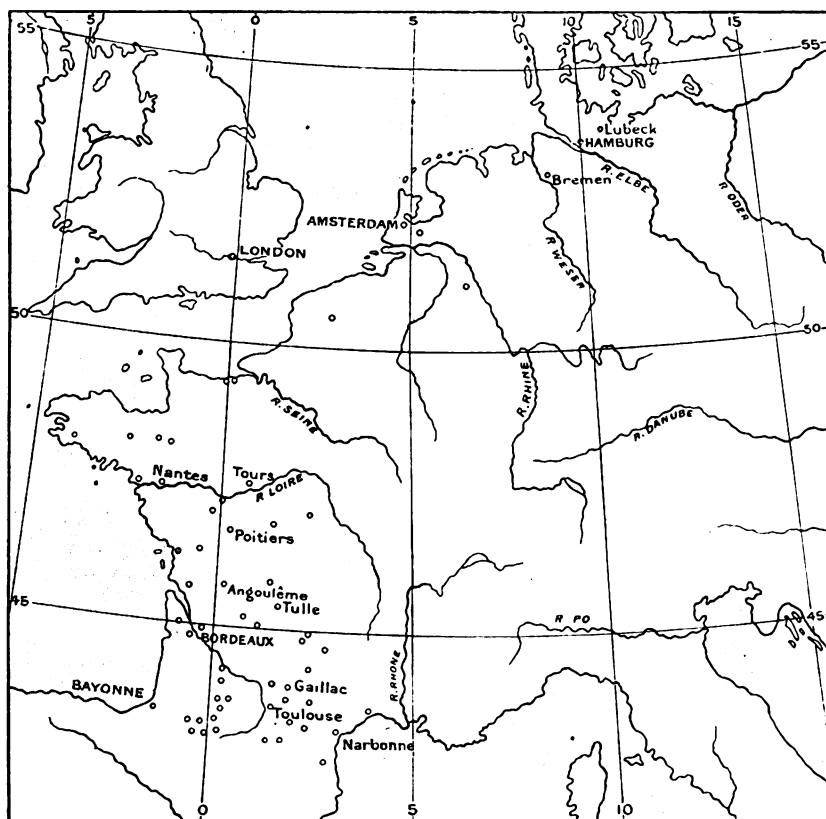


• Occurrences of Paper marked with Crozier, as recorded by Briquet.

papers hardly overlapping at all, except in the case of such a noted emporium of trade as Hamburg. It must suffice here to point out the interest of such a line of study.

It has been impossible in this paper to refer to more than a small proportion of the vast number of marks current in old days, even though attention has been confined chiefly to the three centuries 1500-1800. Enough has however been said to show that even a general knowledge of the subject may be of some help in authenticating documents or disposing of unfounded claims, and there are cases where such a general

knowledge may be of more help than even a thorough knowledge of a limited period only. Thus the mere fragment of a mark shown to me as occurring on an engraving, the date of which was in question, could at once be identified as part of the shield and crown of the type seen in No. 115, which was certainly not in use in the fifteenth century, when the original engraving was made. Again, a minute patch used in repairing a leaf of an Ortelius when last re-bound could at once be seen to contain a small part of the crown and "mantling" in the Arms of



◦ Occurrences of Paper marked with Hand and Crown, as recorded by Briquet.

Amsterdam, as found elsewhere from about 1680. It is thus important that students should acquire such a general knowledge of the whole period in which watermarking has been practised, before specializing on more limited periods, which may also be advisable in view of the tens of thousands of marks that have to be dealt with. In proportion as the data accumulate, the precision of the results will increase. If it be thought that the positive results here mentioned are of no very great importance, they at least show something of what may be done, and if we learn to use the help offered with insight and discretion, we

may no doubt find that really important points can occasionally be settled in this way.

Before the paper the PRESIDENT (the EARL OF RONALDSHAY) said: The lecturer this afternoon requires no introduction to an audience of this Society. Mr. Heawood is going to tell us something of his researches bearing upon the use of watermarks in paper in dating old maps. He will be able to show, I think, that watermarks are of value not merely in dating old maps but also in testifying to their authenticity. He will probably give us as an example the case of the famous atlas of Lafreri which was compiled in Rome some time in the sixteenth century. Mr. Heawood will be able to tell us what he has learned with regard to that atlas from the study of the watermarks on the paper of which it is composed. I will not stand longer between you and the lecturer, but will ask him to proceed.

Mr. Heawood then read the paper printed above, and a discussion followed.

The PRESIDENT: Is there anybody present who would like to say something on the subject? I understand that the discoverer of one of the early maps mentioned by Mr. Heawood, namely Mr. Stevens, is here; perhaps he would like to say something.

Mr. HENRY N. STEVENS: I was extremely interested at seeing on the screen that very large tower surmounted by a crown, because some twenty years ago it led to the identification of one of the most interesting maps ever discovered. The circumstances are these: about thirty years ago at one of the leading London auction rooms I purchased a very imperfect copy of the 1513 Ptolemy, with only one map in it, which at the time, to my shame, I thought was the ordinary modern one of the world, the first map in the supplement to that edition. I put that book away in a cupboard, hoping some day to get a copy which it would help to perfect, and there it lay for some years. In due time another copy came along, and when comparing it with the first one I was suddenly struck by the dissimilarity of the two maps of the world, although at first sight they appeared similar. The original one had all the letterings printed from type apparently inserted through holes cut in the wood block, whereas the ordinary map of the 1513 Ptolemy is engraved throughout in Gothic letter. The curious point was that the map with the type lettering bore the name America, for at that time there was no printed map known, bearing that name, of authentic date earlier than 1520. Seeing that the 1513 Ptolemy map does not bear the name America, and that the same block of it was re-issued in 1520 still without the name, it seemed almost a paradox that the type-printed map bearing the name America should be earlier than the one without it. Still I had a suspicion in my mind that the type-printed map was earlier than the engraved one. I went to the British Museum and received the help of the late Mr. Proctor and other authorities, but we could not identify this type in any form whatever, until one day Mr. Proctor said that he believed it was Italian. We then got out some Rome and Venice books wherein we found similar types, which however on closer examination proved slightly different, so finally we gave up altogether the idea that the map had been printed in Italy. The name America suggested St. Dié as the place in which the map was originally prepared, and from the fact that it was not printed in St. Dié type sprang my idea that it must be anterior to the introduction of printing into that town, which we know was in the spring of 1507. At the time of which I speak, and it was con-

siderably more than twenty years ago, the large Waldseemüller map of 1507 in twelve sheets had not been discovered, and nobody knew what it was like. We could not identify the type of my printed map in any form whatever. We tried Strassburg and many other towns in Germany and France within a radius of a hundred miles or so from St. Dié, but entirely without success.

Finally we thought that possibly the watermark might be the key to the situation. In 1900 Briquet's book had not yet been published, and little could be learned about watermarks from other books. So I had a tracing of the watermark made and sent it to various correspondents in France and Germany, and a gentleman in Southern Germany wrote me that I should find a facsimile in Hausmann's book about Albert Dürer. We got that book out at the British Museum, and there sure enough was our watermark, and we found that it was used in the three great books of Dürer, 'The Passion,' the 'Life of the Virgin,' and the 'Apocalypse,' all printed in Nuremberg in 1511. No use of this watermark could be traced after that date. It will thus be seen that we immediately got back to where we wanted to be, namely a time anterior to 1513, in which year the engraved Ptolemy map was published. I examined the Dürer books in the British Museum, and there, printed on the very same paper, was apparently the identical type used on my map. But when we came to look a little more closely we found the Nuremberg type in the Dürer books was of a slightly later fount than that used on the map. We traced the type back gradually in other books in the British Museum, until we found that the type on my map was such as was in use at Nuremberg from 1501 to 1508. Further comparison of the strength of the impression of the type in various Nuremberg books between those dates appeared to indicate 1506 as the approximate date of the printing of the map. The whole of this identification thus emanated from that watermark. After that we found some historical evidence which also showed that something was done in the preparation and printing of the map prior to 1507. All these points tend to indicate that my printed map may well be the earliest to bear the name America and to show any part of the new world discoveries.

Mr. Heawood also said something about the use of watermarks as regards detecting spurious things. I had a very curious case which may interest you. About ten years ago I bought at one of the auction rooms a copy of Hakluyt's 'Principall Navigations,' 1598-1600, which was described as having the original leaves of the voyage to Cadiz. I purchased that copy for about £40, and when I took it home and collated it, I found the Cadiz leaves were in facsimile, so I sent the lot back to the auctioneers with a notification of the defect. A day or two later they wrote saying that their head cataloguer begged to differ; that the Cadiz leaves were quite genuine, and would I kindly say on what evidence I declared them to be facsimile; moreover, they had called in a special expert to look at the book. I wrote to say that they were quite wrong; that the leaves were certainly in facsimile and that I was quite prepared, if they would send their expert to see me, to convince him in two seconds that I was right. They did not however send him, but asked me to write and state the reasons for my contention. I replied that if the expert would hold the paper up to the light he would find one of the Cadiz leaves bore the watermark of J. Whatman 1804. They immediately apologized and said it was the finest facsimile they had ever seen.

I had another case. An American gentleman came to see me and brought with him a very fine impression of the Carwitham view of Fort George, New York. I think the date of it was 1750 or thereabouts, and I told him it was

a very fine copy but hoped he had not given much for it. He replied that he had given a long price, and added that he had bought it as an original. I said, "Well, it is difficult to say exactly what is an original and what is not, but this is a re-strike. If you hold the paper up to the light you will see that it has Whatman's watermark of 1809." It was an impression from the old plate struck off on a piece of modern paper. So there are three examples of how I personally have found the greatest advantage from the study of watermarks.

THE PRESIDENT: It seems to me obvious that Mr. Heawood has brought before us this afternoon a subject which has hitherto enjoyed very little publicity, and we are very much indebted to him for having introduced us to so novel and at the same time so interesting a subject. There was a great deal in the course of the lecture which certainly was entirely new to me, and it would seem from what Mr. Heawood himself said that there are still matters connected with these watermarks which are conundrums to him. He referred to a particular monogram, for example, and pointed out to us that it appeared to have been made up with the letters "I L P", but he did not go on to tell us what the I L P stood for. In these days some of us might have jumped to conclusions which would hardly perhaps be justified by the antiquity of the mark. That is one of the matters which are still a conundrum to Mr. Heawood himself, but he certainly has, I think, told us enough to show the tremendous possibilities which lie before further research work in this particular subject. The only other contributor to the discussion this afternoon has certainly told us much which confirms the value of these watermarks in proving the authenticity of maps and documents. I think there is nothing more that I can say except to express, on your behalf, your gratitude to Mr. Heawood for the time and care which he has given to the presentation of the subject which he has put before us this afternoon.

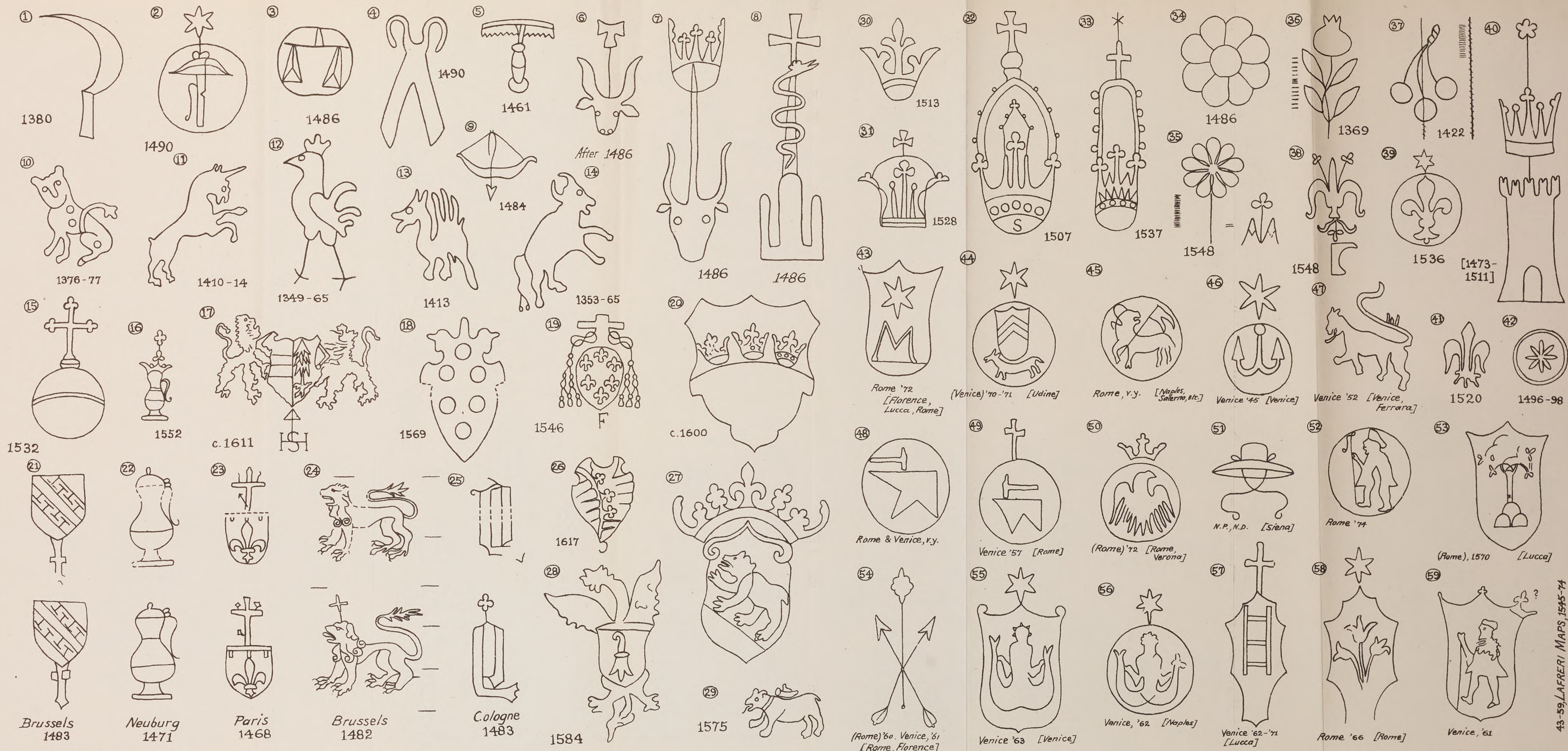
AMERICAN DEPENDENCE ON FOREIGN PRODUCTS

Albert Perry Brigham, Sc.D., L.H.D., Professor in Colgate University, Hamilton, N.Y.

Read at the Meeting of the Society, 25 February 1924.

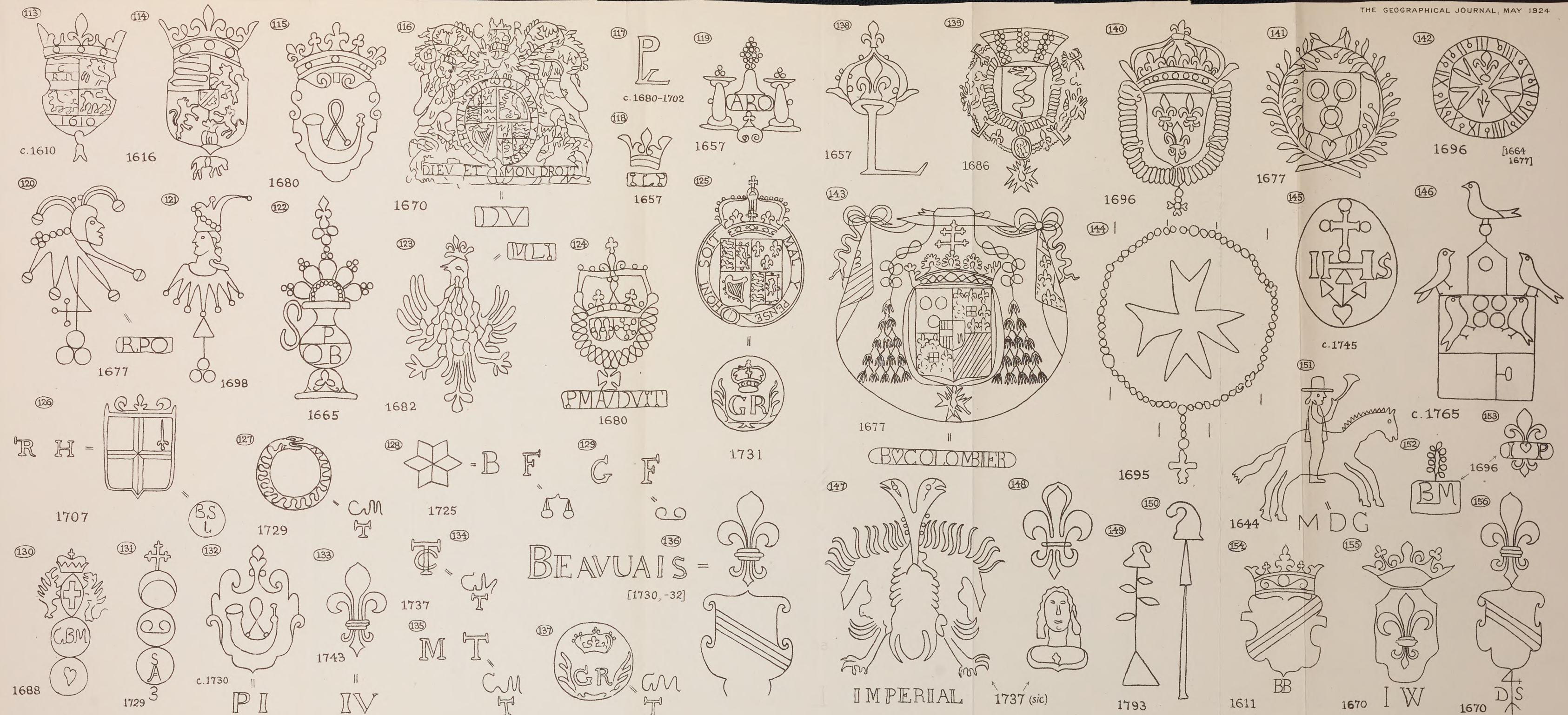
IT is not of importance to analyze the items of American commerce except as they may throw light upon the relations which the nation has, and will have, with the rest of the world. It is proposed to turn the eye of geography upon one factor of internationalism.

America has grown up through youth to maturity in a state of isolation and could not be seriously menaced, even to-day, by any hostile nation save in the free passage of ships across the seas. For long there were few people and limitless resources. The grosser elemental needs were met at home, and many of the finer things that go with high standards of living were left out. There was a continent of incredible richness to be developed, and during most of the nineteenth century the attention of the nation was turned inward upon itself.



Scale reduced to one-half throughout.





Scale reduced to one-half throughout.

157



1644

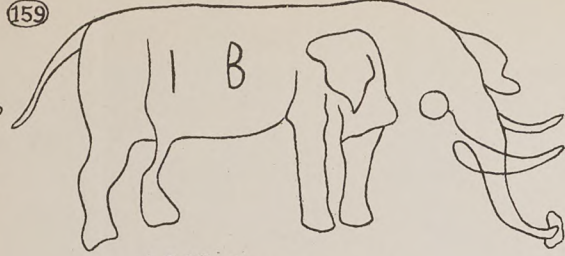
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1685-6

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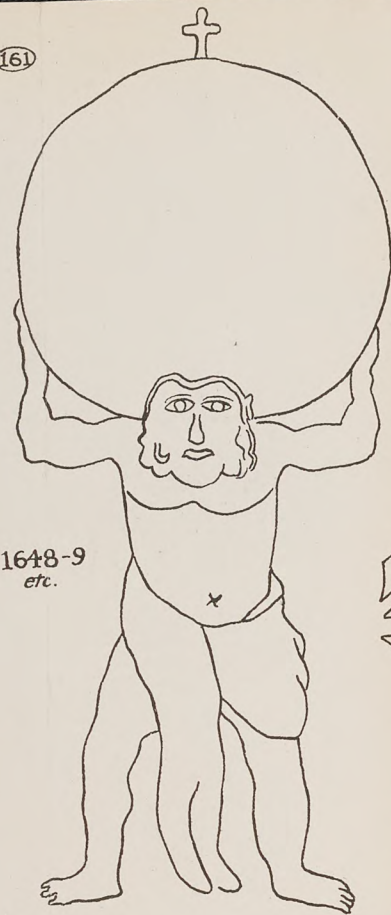
1648 etc.

160



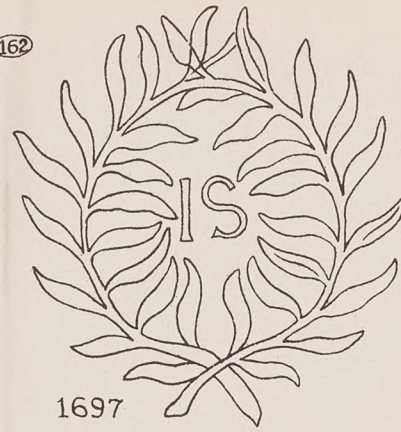
1668

161



1648-9 etc.

162



1697

163



1742

164



1698

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1745

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1705

1756

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174



1766

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1739

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1739

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= IK

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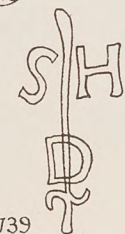
c. 1730

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1739

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1739

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L V C

1763

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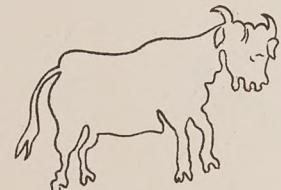
1796

G L LEVERATTO

1761

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